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ON SOME REPTILIA AND BATRACHIA OBSERVED IN NORMANDY.

By G. T. ROPE.

THE Slow-worm, *Anguis fragilis*, appears to be of common occurrence in Normandy; I met with it at Oisel, and again in the neighbourhood of Dieppe. A single specimen of the Viper, *Pelias berus*, was obtained in a large wood containing open patches of heath, situated near La Bouille, a village on the Seine, a few miles below Rouen. We met with only two or three specimens of *Rana temporaria* during the month spent in Normandy, *R. esculenta* being far more abundant.

The Edible Frog, *Rana esculenta*, was abundant everywhere, frequenting stagnant ponds, but was not found in running brooks, or even in the ditches communicating with them. It is shy and wary in the extreme, the sense of sight, and probably of hearing also, being apparently well developed: it is only, indeed, by using the greatest caution that a glimpse of the handsome green-jacketed little fellow can be had as he sits on the bank of the pond, perhaps a foot or two above the water, ready, at the faintest suspicion of danger, to take one flying leap into the pond, going at once to the bottom. In that element, however, he seems to feel more secure, and many a sly-looking head may there be seen with eyes and nose only above the surface, ready to disappear at the shortest notice. In large ponds, however, these frogs may often be seen floating at ease on the surface at

a safe distance from land. There is a decidedly crafty expression about the countenance, which, combined with a habit of winking or snapping the eyes at their would-be captors, is irresistibly ludicrous. Some of these frogs were of a size fully equal to that of two large English frogs (*R. temporaria*). I managed, with difficulty, to catch some seventeen specimens, which I brought alive to England, hoping, should the herons and rats permit, to establish a colony of them here. They vary considerably in colour and markings, the yellow lines on the back being much more pronounced in some individuals than in others; in our two largest specimens they were scarcely of a lighter tint than the rest of the back, and in another the upper parts were of a rich brown instead of green. Owing to their extreme shyness and vigilance they were very difficult to catch with a hand-net, but a bent pin and worm proved more efficacious, and was the means of bringing several to land. Although the noise these frogs make in August is nothing compared with that heard in early summer, they are not altogether silent, but in places where they are numerous may be heard giving tongue in a subdued manner if cautiously approached. We found the tadpole of this species in immense numbers, in ponds near Rouen, and at La Bouille, a few miles lower down the Seine; they were of large size, equalling a small cherry in bulk, and with the tail measured in many cases nearly two and a half inches. In colour they were of a light greyish brown above, having on the back and the sides of the tail a few small blackish spots; the under parts thickly studded with minute white specks. They were in various stages of development, some having as yet no signs of limbs, while others had acquired both pairs, and had very little tail remaining. Some of these youngsters were ready to leave the water, and as their colour at this period of existence differs materially from that of the adult, I will attempt to describe that of a specimen I have now alive:—Upper parts light brown or grey, lightest on the head, covered with minute warts of a lighter tint; a ridge of larger warts of a light colour extends low down along each side, reaching nearly to the hind legs; lips, sides of head, and legs, speckled with dark brown; under parts very thickly covered with minute whitish warts; thighs below, dark flesh-colour.

In a small roadside pond near La Bouille I found *Bombinator igneus*, and obtained ten specimens, but saw it nowhere else, not having the opportunity of examining many ponds. Those I saw were generally near the edge of the water, with only the head or part of the head above the surface, and looking so much like little bits of mud that it was no easy matter to make them out. On the 23rd of August I obtained a young one of this year's hatch, having still a little bit of tail remaining, but could find no tadpoles of this species, although the pond contained an immense number of those of *Rana esculenta* and of some species of Newt. The relative difference in size between the male and female *Bombinator*, seems to be about the same as that of the Common Toad. Those I brought to England feed readily on small earthworms. As soon as they are aware of the presence of food they become very much excited, and are quite as likely to seize one of their companions by the leg as their legitimate prey. The same thing is very noticeable in the case of the Smooth Newt, *L. punctatus*. The strange habit these little creatures have of throwing the body and limbs into the most violent contortions, when suddenly startled, is very remarkable, and gives them for the time being a most uncanny appearance. They suddenly flatten and depress the body in a wonderful manner, at the same time closing the eyes and throwing up the head, and all four limbs into the air, so as to form a sort of cup, of which the middle of the back is the deepest part; this gives them somewhat the appearance of a dead frog or toad which has been dried up by the sun, and the very uninviting appearance they present at such a time is possibly a valuable source of protection to them from their enemies. The thick and somewhat clumsy appearance of the hind feet is much more observable in some specimens than in others.

Bufo vulgaris appeared to be decidedly less numerous than in England, but possibly the time spent in Normandy (less than a month), may have been scarcely long enough to justify such an opinion. Few specimens were found and those mostly immature. Some young fry just leaving the water were seen on the banks of a pond at St. Pierre. In common with some of the other batrachians, the Toad is very subject to a loathsome and deadly disease, the cause and nature of which I know nothing, but which generally shows itself first in the form of a sore place

on the nose, spreading gradually all over the face till it is consumed away. This summer I discovered a large female Toad in which the whole face up to the eyes was literally gone, the cavity of the skull being filled with maggots as large as the animal's toes, yet the poor animal was still living. I have noticed the same disease, but less frequently, in Frogs (*Rana temporaria*), in *Triton cristatus* and *alpestris*, and in *Salamandra maculosa*. The Newts when attacked waste away very rapidly, and in their case the sores are by no means confined to the head, but break out in various parts of the body.

Notwithstanding the diligent search made for Salamanders, I was unable to find a single one until the day before leaving for England (September 1st), when I accidentally came across the crushed body of a remarkably large female *Salamandra maculosa* which had recently been run over in the road at St. Aubin near Dieppe. Considering the lateness of the season I was surprised to find that this individual contained eggs, some of which were hatched, the young animals resembling Newt-tadpoles. There was a pond at a short distance from the spot where it had been killed, and it may have been journeying in search of such a place, to serve as a nursery for its offspring, when unfortunately destroyed by the wheel of some passing cart. I have had a pair of Salamanders for twelve months in confinement, but as yet have been unsuccessful in getting them to breed. Their favourite food is earthworms, and I have never seen them swallow anything else, with the exception of very small slugs, and in one instance a small white grub.

A few specimens of *Triton cristatus* were obtained at a pond at La Bouille, near Rouen, in company with *Triton alpestris*, the latter species being far the more abundant. I obtained here a variety having a large portion of the under parts black.

The commonest Newt by far to be found in Normandy, in August, was *Triton alpestris*, and I managed to bring home alive to England about thirty specimens, several of which however have since died of the disease mentioned above, many having the toes and parts of the feet completely gone. They were fed on earthworms, which they ate readily, but possibly they suffered from the want of some other food. Not being perfectly sure of the species of this Newt, I sent some specimens to Mr. Southwell, of Norwich, who kindly examined them, confirming my opinion as

to their identity. I found the tadpoles either of this species or of *Triton cristatus* (or perhaps of both) in various ponds in Normandy. The Newts were generally seen in the shallow parts of the pool, either resting or crawling along the bottom.

Lissotriton punctatus appeared to have mostly left the water, several specimens being found on land, underneath large stones, whereas I only took one from the water. I recently kept some Newts of this kind in a box with a glass front, partially filled with bark, rotten wood, and moss, with only a small pan of water. They lay hid among the moss all day, but at night were very active, and often visited the water. Excepting during the spring both this species and *T. cristatus*, according to my experience, pass more time on land than in water, but require a considerable amount of moisture notwithstanding. In confinement they are very voracious, and often seize objects far too large for them to swallow. I have seen two of these little creatures, of about equal size, striving manfully to swallow each other. On first attaining the perfect state these Newts are extremely small, being often much inferior in bulk to the full-grown tadpole.

FIELD NOTES IN NORWAY IN 1882.*

By the Rev. H. H. Slater, F.Z.S.
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(Concluded from p. 14.)

Long-eared Owl, *Asio otus* (L.)—I saw one in the pine woods above Lillehammer, the only Owl I actually saw alive in Norway, though I once heard a Tawny Owl.

Hen Harrier, *Circus cyaneus* (L.)—I saw a pair in the marshes at Fokstuen for several days, and generally in exactly the same spot, so I went to try and find the nest, which I was pretty certain was there. In this I was unsuccessful, but on one occasion the male attempted to mob me, and was secured. On my arrival at Christiania I was pleased to find that no adult male had been obtained in Norway for some years, though immature

* These notes were made in the spring of 1882, not 1881 as stated on p. 4.

examples occurred occasionally, so I had the pleasure of presenting my specimen to Professor Collett for the new series of Norwegian-killed birds he is making for the University Museum—and a splendid series it is, which every ornithologist who sees must admire. I am doubtful whether to attribute a bird I saw at Laurgaard, beating the marshes by the river, to this species or to *C. æruginosus*. A Harrier it certainly was, and I am inclined to think of the latter species, as its colour seemed to be of too dark a red-brown for any other species. I am only inclined to hesitate by the extreme rarity of the Marsh Harrier in Norway.

Buzzard, *Buteo vulgaris* (Leach).—I saw one flying over the town at Lillehammer; my attention was called to it by the great commotion made by White Wagtails and Swallows as soon as they saw it.

Rough-legged Buzzard, *Archibuteo lagopus* (Gm.)—I am inclined to attribute to this species a bird I several times saw near Laurgaard, but I was never near enough to be certain. I paid some attention to what I think must have been the cliff between Fokstuen and Hjerkinn, where Mr. Mitchell took the nest of this bird ('Zoologist,' 1877), but could not see that it was tenanted.

Sparrowhawk, *Accipiter nisus* (L.)—Not uncommon. Noticed at Lillehammer, Laurgaard, and on the Dovre.

Merlin, *Falco æsalon* (Tunst.)—A pair near Hjerkinn seemed by their conduct to have a nest near at hand.

Kestrel, *F. tinnunculus* (L.)—Not uncommon; I saw more near Laurgaard, I think, than anywhere else.

Pink-footed Goose, *Anser brachyrhynchus* (Baill.)—Whilst I was at Lillehammer a pair were shot by night out of a flock of ten making their way up the Logen to breed somewhere in the north. Both were females, and the one I bought had a conspicuous white line round the base of the upper mandible, an unusual circumstance in this bird. On dissection well-developed eggs were found, which, from their size, would have seen the light, under ordinary circumstances, in a week or ten days. Prof. Collett, to whom I showed the skin, was surprised at this circumstance, as this bird is rare in Norway, usually seen on migration only on the west coast, and has never been satisfactorily proved to have nested in the country.

MALLARD, *Anas boschas* (L.)—Common wherever there are suitable spots.

TEAL, *Querquedula crecca* (L.)—Common, especially at Fokstuen, where it was laying.

SCAUP, *Fuligula marila* (L.)—I saw several Scaup on the Miösen Lake, near Lillehammer. A large flock, of males only, on a lake near Fokstuen, the females being apparently sitting.

TUFTED DUCK, *F. cristata* (Leach).—I am pretty certain I saw a pair near Fokstuen, but was unable to get near enough to be quite sure. With an india-rubber boat great things might be done amongst the duck at Fokstuen. I never cared to shoot them for food (although food was neither plentiful nor varied at that station), but I did shoot a couple of Teal for the Sunday dinner of my wife and myself at a time of great scarcity. I may as well here advise intending visitors to Fokstuen to take some bread or biscuit and tinned meat and soup with them; all that can be obtained there is coffee, beer, fladbrod (rye-bread made the summer before), occasional eggs, and grayling, which at our visit were out of season, and kept getting staler and staler every day.

GOLDEN-EYE, *Clangula glaucion* (L.)—I saw an adult male on Lake Miösen from the steamer, when first arriving at Lillehammer, but never satisfactorily identified the bird afterwards.

VELVET SCOTER, *Oedemia fusca* (L.)—I saw a few on the Miösen Lake, several small companies on the still parts of the Logen, on our way up the Gudbrandsdal, and a good many on the lakes at Fokstuen.

COMMON SCOTER, *O. nigra* (L.)—I saw many on the Miösen, and a great number at Fokstuen, and elsewhere on Dovre.

GOOSANDER, *Mergus merganser* (L.)—I saw several on the Miösen, and a pair in the marshes at Laurgaard. There were some Mergi at Fokstuen, but I do not know of which species.

RED-BREASTED MERGANSER, *M. serrator* (L.)—I obtained a fine male in breeding plumage at Lillehammer, but did not identify it elsewhere.

RING DOVE, *Columba palumbus* (L.)—Plentiful at Lillehammer and in the Gudbrandsdal; not seen on Dovre.

PTARMIGAN, *Lagopus mutus* (Leach).—First met with on the fells above Laurgaard, where it seems fairly abundant in suitable places; also near Fokstuen.

Willow Grouse, *L. albus* (Gm.)—Pretty plentiful in the birch region on the fells, and occasionally met with in the edge of the fir-growth. I saw a good many at Laurgaard, also at Fokstuen. The similarity of the male bird's call when rising to that of the Red Grouse is striking to one accustomed to the latter.

Hazel Grouse, *Bonasa betulina* (Scop.)—I did not meet with this bird alive, which, I believe, is not an uncommon experience with foreigners in Norway, but I bought a male (snared, of course) in Lillehammer.

Corn Crake, *Crex pratensis* (Bechst.)—I heard the note of this bird at Naersness, and once at Lillehammer, where it seemed uncommon.

Common Crane, *Grus communis* (Bechst.)—Inasmuch as Mr. Mitchell (*l. c.*) never saw a Crane at Fokstuen during his visit, I did not particularly expect to do so either. On the second day, however, after my arrival (June 2nd), I was wading through the swamps below the station, and wondering what would turn up next (for Fokstuen is a place, ornithologically, of pleasant surprises) when my eye fell on a small bare turf island in the middle of a swampy pool, about sixty yards distant, where I at once caught sight of something like a large egg. I approached, full of anticipation, and found two large eggs, and Crane's to boot; whilst looking at them, not without pleasure, my attention was caught by a faint chirp, which proceeded, as I found at length, from one of the eggs, the chick whereof had broken the shell, and was complaining, as I took it, that he could not get out. So I concluded that the egg I was holding was addled (as it was), and thought it best, considering the intense heat of the sun, to take it at once for fear it might burst. So I retreated to an adjacent bush, where I crouched down, suspending my gun in the willows, in the hope that the parent would return whilst I was employed in cleaning and blowing the egg, to gratify my curiosity to watch her at her nest. Soon I heard her cry, like a distant bugle, and made her out approaching stealthily in a somewhat crouching attitude. However, she did not come near (having, as I imagine, caught a flash from my field-glasses), and, after wandering about for some time, she got up and flew round in a wide circle, being shortly joined by her mate, and both trumpeting loudly. I thought their cry the finest I had ever heard from any bird's throat, but doubtless the wild and solitary spot, surrounded

by a circle of snow-covered hills, materially heightened the effect. They soon flew off altogether, and, having watched them till about a couple of miles off, I went to take another look at the nest. It consisted of about as many short willow sticks and reeds as might be grasped in one hand, scattered in a loose untidy ring round the eggs, which lay on the bare flat ground, there being no material depression. I then went my way. The next day I took a look in passing, and found the young bird quite hearty, and the empty egg-shell lying near. Two days afterwards I went again and found the nest deserted, and the chick dead, which I manufactured into a respectable specimen of the Crane in down. The removal of the addled egg must have disturbed the minds of the old birds after all, added to the fact that the nest was in the most productive part of the marsh, and they must have heard my gun every now and then not far off. I was, however, much surprised to see the old bird rise close to the nest, about a hundred yards from me; my sudden impulse was to fire at her, without any visible result. Later the same day I was about two miles to the S.W. of the nest, and heard the then familiar cry of the Crane still further towards Dombaas, and soon made out two Cranes about half a mile or more from me, and, as they were on lower ground than I, and their movements clearly visible, I lay down and watched them with my glass. To my surprise their spirits were so little depressed by recent events that they were actually building a new nest two miles and a half from the old one. I could see one of them picking up and arranging some short sticks, apparently in a very fastidious way, while the other stalked slowly about, with erect neck, trumpeting at intervals; every now and then the one building uttered a note also. I had no doubt at the time (though I was not so certain afterwards, for reasons which will appear) that they were the same pair of birds whose nest I had found, as I had previously remarked that their two voices were pitched at an interval of "a third" apart, and I remarked the same thing now. The next day we all left for Hjerkinn, and I walked on in advance of the rest. When about four miles from Fokstuen, the day was so hot that I sat down and took a look around, and my pleasure was great to see four Cranes together on an island in the midst of the valley less than half a mile from the road where I was. I watched them for half an hour or so, when the others came up, and noticed that whilst three of

them gave themselves up to feeding and arranging their feathers (giving great attention to the tail-plumes), the fourth stood perfectly still, with erect neck, as sentry. The rest of our party examined them also, and the remark was made that they looked "almost as large as Ostriches." They certainly looked very large.

Golden Plover, *Charadrius pluvialis* (L.)—I did not find this bird as common on the Dovre Fjeld as I expected. I saw three pairs feeding on the marshes at Fokstuen in the evening; at Hjerkinn I found a nest, from which, as I wanted a specimen in full summer dress, I shot the bird. There were two things noteworthy; that, though the eggs were fresh, the bird lay on the nest till almost trodden on, which conduct generally indicates, with the Golden Plover, that the eggs are not far from being hatched; secondly, that the sitting bird, as I found on dissection, was a male. I have never seen it remarked that the male Golden Plover assists in incubation.

Dotterel, *Eudromias morinellus* (L.)—I only saw this bird once; one of the pairs of Golden Plover, which I have mentioned as feeding in the marshes at Fokstuen, was accompanied by a solitary Dotterel.

Red-necked Phalarope, *Phalaropus hyperboreus* (L.)—Pretty common in the marshes at Fokstuen, but showing a preference (as many birds do there) for one spot. Not breeding when I was there, as evident from the ovary of one female. Very tame, pretty little birds, looking on the water like miniature ducks, from their plump shape and carriage. When you come upon them in the marshes they rarely rise, unless you throw something at them, but swim about in a pool ten yards from you, and retire behind a tussock to hide if you make demonstrations; they were such nice little birds that I could hardly persuade myself to shoot any. I saw none at Hjerkinn.

Woodcock, *Scolopax rusticola* (L.)—Of this bird I only found the dried remains in a small "gill" near Lillehammer.

Great Snipe, *Gallinago major* (Gm.)—Pretty common at Fokstuen in the marshes, the only place I saw it alive, though I picked up a freshly-killed female under the telegraph-wires near Hjerkinn Station. I found one nest at Fokstuen, on a hummock of turf in a dry part of the marsh, placed under a bush of *Vaccinium uliginosum*; the bird rose silently (as the Great Snipe

always does) and fluttered away; there were four eggs. On another occasion, as I was going through the marsh, I heard distinctly a bird snapping its bill. Going to the spot whence the sound proceeded, I flushed a Great Snipe; I fancy it was snapping its bill at me.

Common Snipe, *G. cælestis* (Fr.)—I put up a pair from a small marsh at Fokstuen, the only ones I saw there. I saw one at Lillehammer, and heard another drumming at Hjerkinn.

Broad-billed Sandpiper, *Limicola platyrhyncha* (Tem.)—Pretty plentiful at Fokstuen, and just below the station at Hjerkinn. I did not find the nest, nor did the ovary of a female I procured at Fokstuen lead me to suppose I should, though at Hjerkinn—which, both in Ornithology and Botany, is decidedly earlier than Fokstuen, although the places are, as near as possible, at the same altitude (the ornithologist will do well to take Hjerkinn first)—one contained an egg which would have been laid in a few days. They are not easy to shoot, as they have a perplexing way of rising at your feet in a great hurry, and flying off as if they meant to go for miles, and then, just as they are at a right distance to kill, dropping down suddenly, and causing you to shoot thereby over their heads. They frequent grassy and sedgy parts of the marsh where the ground is neither too wet nor the vegetation too high, never being seen actually in the water or amongst bushes, but where the soil is such that an ordinary man's foot would sink a couple of inches into the mud at each step. They lie, usually, very close, rise with a low but shrill whistle, and almost invariably are in pairs; in wet and windy weather, however, like most other birds, they become very wild, and I have seen them at such times go through the same motions as a drumming Snipe, the descending motion with quivering wings being accompanied by a high tremulous whistle. Those shot at Fokstuen have a slight rufous tinge in the breast, due to the iron oxide in the wet soil they frequent.

Common Sandpiper, *Totanus hypoleucus* (L.)—Common by every stream and lake. They made their appearance at Lillehammer on May 17th.

Green Sandpiper, *T. ochropus* (L.)—I saw several near Lillehammer and several near Laurgaard, but for some reason or other I did not see it at Fokstuen in anything like the plenty I had expected.

Wood Sandpiper, *T. glareola* (L.)—I saw one at Lillehammer, and one or two at Laurgaard. At Fokstuen they were very plentiful, but not breeding when I was there; at Hjerkinn they were equally abundant in the marsh below the station. I may as well add, for the benefit of ornithologists visiting Hjerkinn, that that marsh below the station is dangerous in places, though not at the end nearest the station. I sounded in one place with a pole, and found that under the thin and quivering crust of matted vegetation on which I stood were about six feet of water and thin mud. I may mention that for marsh-work in Norway I found a pair of ordinary waterproof fishing-stockings excellent, and wore with them a pair of light india-rubber brogues, which latter should be laced, or they may be drawn off the foot by the mud. They are more pliable than long leather boots, and lighter; you can kneel down in them comfortably in shallow water, and, when not in wet places, can let them down, when they are quite cool. They are also a delightful covering when travelling by carriole or stolkjœrre in wet weather.

Common Redshank, *T. calidris* (L,)—Plentiful, but local, at Fokstuen; one pair in the marsh below the station at Hjerkinn.

Lesser Black-backed Gull, *Larus fuscus* (L.)—I saw a flock of about twenty on May 16th at Lillehammer, frequenting the islands at the mouth of the Logen, apparently intending to breed there; but as the river kept rising, owing to the melting snow, they went in a few days.

Black-throated Diver, *Colymbus arcticus* (L.)—I saw a great many on the Miösen Lake as we went up in the steamer to Lillehammer on May 16th. Going up the Gudbrandsdal I saw a good many on the stiller reaches of the river; in one place of the kind there were four, which seemed quite unconcerned at the sight of five carrioles going along only about eighty yards from them. At Laurgaard I saw several on hill-tarns, but none on the Dovre Fjeld; had I had a boat at Fokstuen I should probably have seen some.

Great Northern Diver, *C. glacialis* (L.)—Several near the islands at the mouth of the fjord at Christian Sand on May 7th.

ON THE TREATMENT OF SNAKES IN CAPTIVITY.

By Arthur Stradling, C.M.Z.S.

(Continued from p. 24.)

The tank and water-supply are of greater importance still. Nearly all snakes love to drink and bathe frequently, often lying in the bath for days together, while some (such as the Anaconda) spend more time in the water than out of it. This habit is more noticeable among big serpents as a class than among small ones. The tank, therefore, should be roomy, so that the largest specimen may be able to get bodily into it with comfort; it should be placed at the extreme back of the cage, leaving no interval between it and the hinder wall; the bottom must not be sunk below the level of the floor; and it will be a great advantage to have the front of it made of glass. Then the reptiles are never hidden, no matter how deep the tank may be—and a tolerable depth ought to be allowed, certainly not less than a foot clear, to permit of a sufficiency of water at all times, without overflow when the snake's bulk is submerged; their behaviour in that situation, interesting in many ways, can be observed likewise. Here, too, the glass must be thick; it may be set, for ornamental appearance, in a frame of rough wood or (better) stone. If a lid for this tank can be contrived, either to slide in from the outside through a thin slit in the end, or hinged at the back and worked by a pulley from above, it may be serviceable to separate the occupants at feeding-time, or to shut in a mischievous customer while cleaning out the cage. Soft water is best for them, and ought to be made tepid by lying in a cistern placed upon some part of the heating apparatus before it is admitted. One of the greatest defects of the old reptile-house at the Regent's Park Gardens is the want of means for warming the water outside the cages; it flows in cold, and remains some time before it is raised to a proper temperature, since it receives heat only from the general surroundings. The disadvantages of such a state of affairs are numerous. Snakes at a high temperature plunge suddenly in, and are not only thereby often induced to regurgitate their food, but may take a fatal chill, especially if on the point of shedding their skins; or they may become so numbed and paralysed as to lie there and die. The

recognition of these facts naturally leads the keepers to delay changing the water as long as possible, particularly in the large tanks, which take a very long time to get warm, and where the Pythons, Boas, and Anacondas constantly bathe; and it becomes foul in consequence—probably the lesser of the two evils, though doubtless both conditions have something to do with the production of that serious disease of the mouth to which I shall refer hereafter. The water should be changed and the tanks cleansed frequently.

The heat, as I have said, is best applied to the cage itself rather than to the apartment in which it stands; and there is another reason for this, besides the one mentioned at the commencement of this chapter. The very solidity of construction which renders the den admirably calculated to keep in and economise any warmth generated in its interior, serves often to *exclude* that of the outer atmosphere. I have remarked this in the Reptilium of the Jardin des Plantes in Paris. The building is heated by enormous stoves, and becomes at times quite oppressive to the visitor. But the cages, which are glazed on two sides and, in the case of the larger snakes, are so arranged as to be visible from the outside of the house, have no special appliance; and one is quite surprised, standing in that sultry air, to find on handling the reptiles how cold they are. As to the mode of application, it is difficult to lay down any rules or offer advice, since this must depend in every case upon the situation and opportunities. Hot water is decidedly to be preferred to hot air, and if a gas-stove is used it ought to be placed outside the building or in such a position that no vapour may contaminate the air within the cage. Pipes should run underneath the flooring in all directions, and at a very slight depth from the surface (especially if it be composed of Portland cement), as there will be a bed of gravel over this; it is advisable also to have a pipe at the upper part of the cage, so that the reptiles may have an inducement to leave the floor and take plenty of exercise. This upper pipe had better be buried in the wall or walls along which it passes; if exposed, it must be very carefully shielded with thick felt, so that no more than a warmth comfortable to the hand can penetrate. A gentleman writes to me from the north of Germany that he has improved upon this detail, which I sent him when he was building a vivarium for

tropical serpents a year ago, by tunnelling the tree for the passage of a hot water-pipe with good results.

The actual degree of temperature will vary in accordance with that of the natural habitat of the snakes, their progress of acclimatization, the time of year, and the exposure of the cage; heat will of course evaporate more rapidly through four glass sides than through one, and from a structure situated in the open air than from one under cover. Such a position as the former is not likely to be chosen, nor is it to be recommended in any climate subject to severe winters; the difficulty in keeping up the temperature in all but the hottest summer weather is immense, the glass is perpetually dimmed by moisture, shutters are required, and visitors are few and far between in times of frost and snow. Perhaps, on an average, 75° Fahrenheit may be a fair register during the day; slightly elevated before feeding, and allowed to fall to 65° or thereabouts at night. A uniformly high temperature is an evil usually overlooked, and will be mentioned in connection with the topic of hybernation. Great attention should be paid to the mechanism for regulating the heat, that it is always in perfect working order, so that the temperature may be controlled to a degree. If the floor be too hot or too cold, the snakes—although tolerant within fairly wide limits—are prone to vomit, and acquire an irritable condition of stomach; while they may be (and often are) either chilled or scorched to death. A large number of little Nose-horned Vipers, which were born in this country a short time ago, were absolutely baked dry and crisp before they were discovered on the gravel where the parent Viper lay at ease! If rugs are put in at night, they should be removed in the daytime; a better plan, when there is any trouble in keeping up the warmth, is to cover the ventilators and glass with blankets during the night; but if this be not sufficient, the snakes themselves may be covered up.

A small cage for snakes from one to three or four feet in length requiring artificial heat, adapted to stand in any room, may be constructed conveniently on the plan of those which contain moths and tarantulas in the Insectarium in the Regent's Park, with the addition of a reservoir for hot water underneath. Its size must depend, as in the last case, on that of the reptiles it is intended to accommodate, and on the taste of the proprietor. The same rules may be laid down—that it cannot be too large,

that its dimensions must not be less in proportion to the largest occupant than those stated before, and that a similar restriction with regard to the number of inmates is to be observed; but there is a further consideration to be taken into account in the fact that a large cage will require a larger supply of boiling water at one time, but will require to be replenished less frequently than a small one—a point of no small importance sometimes in the domestic economy of a household. Having mentioned this, to obviate the idea that I am recommending any fixed measurements for adoption, and premising that any detail is subject, to meet the exigencies or expediencies of the situation, to the same variation as the size of the whole, I may perhaps doscribe one now before me as a type:—Length, 3 feet 6 inches; breadth, 2 feet 8 inches; height of actual interior, from gravel to cover, 2 feet 4 inches. This case is constructed entirely of glass and metal. The two ends consist of single panes, but the front and back, or long sides, are divided each into two panes, as the glass is ordinary thin window material; single sheets of plate glass might be used. The edges or framework, being of metal, are mere narrow bindings, but are at the same time as strong as stout wooden pillars would be; one end is removeable, sliding upwards in two vertical grooves, for convenience in cleaning the floor of the cage. Each of these four glass sides is bound with a thin ribbon of zinc along its upper margin. The top is composed of a sheet of perforated zinc, fitted upon a quadrangular frame; this is hinged at the back with six attachments (the two long sides are precisely alike, but, for perspicacity of description, I style the one nearer to me and to the centre of the room the front, and the other, against the window, the back), but is so contrived that the frame—about three-quarters of an inch in depth—laps or *fits down over* the front and ends, when the cover is closed, like the lid of a tin biscuit-box. It is secured with a staple and split-ring in front (of which arrangement more anon). The object of this overlapping ledge and the number of hinges at the back is to prevent the snakes from pushing up the soft flexible perforated zinc at any point, and scratching themselves in endeavouring to get through. The sliding end is locked immoveably by the cover, and would, indeed, under any circumstances, keep in position by its own weight.

Looking at the cage as it stands, one might imagine the glass sides to spring directly from the floor, since the lower edge of the panes is exactly on a level with the gravel. In reality, however, that stony carpet is an inch deep, so that the glass is inserted into a low wall of metal of that height, surrounding the floor. The latter is also made of perforated zinc, but the holes are much larger than those above—big enough to admit a dried pea. Underneath is a cistern for hot water, nine inches in depth, and capable of holding thirty-six gallons; but between the metal top of this cistern and the perforated floor of the cage is a space of about an inch and a half, in which lies a shallow tray or drawer, filled with baked earth or sand (the coarser the better) or charcoal, or all three mixed. This drains and purifies the cage, prevents the accumulation of moisture which would take place on a solid floor, and at the same time regulates economically the transmission of heat from below, by virtue of its mal-conductivity, even storing it to some extent for radiation afterwards. Whatever is used—sawdust, earth, or sand—must be quite dry, or it will exhale steam—and should be coarse or crumbled rather than in fine powder. The tray—mine is divided into two—is pulled out in front by a couple of little knobs, like a drawer; once a week is quite often enough to change its contents.

It has been suggested to me that it would be convenient to have the cage and cistern made separately, and stand the one upon the other. I hardly see the advantage myself. It would involve another layer of material between the snakes and the hot water, already separated by gravel, perforated zinc, earth, and two sheets of imperforate metal. Its weight adds very little to the upper part when it is empty; and as the burden of support comes entirely upon the perpendicular metal, there is not the least danger of any part cracking or bulging. The improvements claimed for such a construction,—that the cage is more easily moved, and that the cistern can be sent away to be filled instead of necessitating buckets and kettles to be brought into the room when it is replenished *in situ*,—appear to me to be very doubtful ones. In the first place, such a cage is not intended to be shifted here and there continually, like a parrot's; and to be obliged to lift it off on to a table or the floor every time the water is changed will be troublesome enough, to say nothing of the chance

of breakage. In the second place, to carry away the reservoir full of cold water would be no light job, and to bring it back filled with boiling would be still less easy. I should, therefore, certainly advise my readers who may contemplate setting up an article of this sort to have it connected in the manner I have described, with the cistern, tray, and cage in one and the same construction.

The cost of such a vivarium, without the stand, is about £4 15*s*. The one I am speaking of rests upon a strong iron frame; and great attention must always be paid to the strength and steadiness of the support, whatever its nature may be, as the weight of water makes the burden very heavy, and the disastrous consequences of any accident are too obvious to require comment. The height of the stand will depend upon the depth of the reservoir; about three feet above the ground is a desirable level for the visible floor of any cage, with a view to comfortable observation of the inmates. The top of the stand had better be solid, like a table, to afford level support to the superincumbent water-apparatus; a piece of thin wood will be sufficient, but the bottom of the reservoir ought to be made of extra thickness, or strenghtened with battens outside if resting on a skeleton frame. And below this I keep a humble piece of furniture, which I would strongly recommend as an adjunct to a cage like this to all snake-keepers of normal proportions—a broad, firm stool whereon to stand when doing anything to the interior. Everything should be worked from the open top, and thus elevated, the hand can reach any part with ease. Never use the sliding end, except for the purpose of removing the gravel, and cleaning the floor when the cage is empty; and then lift it out altogether and lay it aside. Sliding *doors* are an abomination; they catch the snakes' heads and tails, get blocked with gravel and refuse to close (which, in this case, would prevent the cover from shutting down also), stick half open at critical moments, and inevitably come to smash sooner or later. As for those finger-amputating, snake-dividing panes of glass with naked edges, which are often used in this connection, the less said or seen of them the better.

The hot-water supply is, of course, the most important question. The receptacle has an aperture of outlet, controlled by a tap, at the lower angle of one side, and a short wide pipe,

bent upwards at a right angle and closed by a screw, at the uppermost border of the opposite end. Over the former a piece of india-rubber tubing is fixed when it is to be emptied, to prevent splashing; while a funnel can be inserted into the other to facilitate the process of filling. And since this operation involves no inconsiderable amount of trouble, it is extremely desirable that the heat should be economised and expended entirely in the right direction, *viz.*, to warm the cage as far as possible. We must endeavour, therefore, to absolutely prevent its evaporation from any surface except the upper by encasing the other five sides of the reservoir in thick non-conductive material. The one of which I write is "packed" in a complete envelope of felt an inch thick, which is adherent to the metal through the medium of a glue-like cement; holes are cut for the two pipes, which are the only exposed points, and caps are made to fit over even these. Underneath, on the top of the stand, an extra bed of felt is laid, and the sides are covered with green cloth for neatness of appearance. It is extraordinary to note how very long this preserves the caloric, considering how lightly the upper surface is defended from radiation; but I may remark here that a depth of nine inches is hardly sufficient for a floor of this extent. It would save time and trouble to allow a foot, for, though the capacity of the tank would be thereby greatly increased, it would require filling much less frequently. The intervals at which the water should be renewed will, of course, depend upon the situation of the apparatus, and the partial or complete covering of the glass and top; and on the capacity of the cistern, out of all proportion to its relative size. Six gallons of water will retain heat ten times as long as two, under similar conditions. The owner must be guided by the indications of his thermometer; such a cage as I refer to requires to be replenished every three days with full exposure in the ordinary temperature of a living-room, but with the cover on would keep warm a week. It should always be quite full, and the water should be as near the boiling-point as possible when it is poured in; a very gradual diminution of the heat may be insured by withdrawing a quantity —say a large kettleful—morning and evening, and *at once* replacing it with boiling. Every particle of heat must be hoarded, and, as undue waste can be prevented with attention to these few details, which are simple enough after once being

reduced to working order, they should never be neglected. The tray of earth will be found to equalise the temperature wonderfully, preventing too sudden an accession when the reservoir is filled, and retarding its decrease afterwards; if it falls very low, a blanket may be spread over the snakes as they lie upon the gravel, but, as we have seen before and shall see again, it is not altogether undesirable that the heat shall be lessened at times.

(To be continued.)

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

By John T. Carrington, F.L.S., and Edward Lovett.

(Continued from vol. vi., p. 391.)

Pagurus ferrugineus, Norman.

This small crab appears to partake of the features of *P. Hyndmanni* and *P. lævis*, for its large claw is reddish in colour, slightly hairy above, but smooth beneath; its remaining legs are banded red and white. It has been recorded from Shetland, Northumberland, the Clyde, and Guernsey; and we have obtained it from the last-named locality.

Pagurus Forbesii, Bell.

This species was described from a single specimen sent to Prof. Bell by Mr. Corks, of Falmouth. The carapace is smooth; antennæ longer than the first pair of legs; eye-stalks club-shaped, and as long as the first joint of the inner antennæ. Anterior feet on the unequal wrist and hand roughly granulate, the second and third pairs slightly compressed and with numerous small reddish brown spots.

This species, we observe, has been recorded from Galway (rare), and off the South Isle of Arran, in sixty fathoms.

Pagurus Dilwynnii, Bate.

The striking peculiarity of this crab is that its left claw, and not its right, is the larger. The colour is of a bluish brown in life, which, however, is lost after death. The second and third joints of the anterior legs are toothed and armed with a medial

ridge. The antennæ are hairy, and are not quite so long as the prolegs. The swimmerets are hairy and bifurcate.

Mr. Spence Bate describes this species from numerous specimens taken in a shrimp-net at Teignmouth, and it has been since dredged off Plymouth; we have also procured it from the same coast in seven fathoms.

Pagurus eblaniensis (Kinahan).

In the 'Natural History Review,' 1857 (p. 84), Dr. Kinahan describes this species, which he, however, thinks may be a form of the young of *P. Bamhardus*, and again at p. 161 of the same volume, at the suggestion of Mr. Francis Day, he surmises it may be the true *P. ulidianus*.

Fam. PORCELLANIDÆ.

This family terminates the British *Anomoura*, and embraces only the genus *Porcellana*.

Porcellana platycheles, Lam.

This crab is of small size, the carapace being seldom over half an inch in length, its breadth being somewhat less. The anterior portion is developed into three blunt prominences, and the rest of the margin is comparatively smooth. The antennæ are about twice as long as the carapace. The anterior pair of legs are large and very broad; they are slightly hairy on their flattened surface, and ciliated on their outer margin with a thick fringe of hair. The next three pairs of legs are armed with a hooked terminal joint, also fringed with hair, and the last pair of legs are simply rudimentary, usually lying on the posterior portion of the carapace.

The colour of this interesting species is usually of a brownish tint, much lighter beneath, but this shade is much regulated by the locality it inhabits. In the young state, especially, it is extremely difficult to discover unless it moves, for it adheres so closely to the rough stones which it affects, and moreover resembles them so completely in colour, that the most experienced eye will often overlook it. Under these circumstances it is not to be wondered at that we find it widely distributed. Prof. Bell states that it had been sent to him from various parts of the coast from the Orkneys to Land's End. We have ourselves collected

it abundantly from the Channel Islands, Devon, Dorset and Cornwall coasts, as well as from the Farne Islands. It has also been recorded from several parts of the Irish coast, as well as from the French coast and the Mediterranean. It seems, however, from what we have gathered, that its development is more favoured in a northern than in a southern locality, specimens from the north being generally larger and finer than those from the Mediterranean; this rather curious fact obtains with some other species.

Being a shore crab it is easily obtained at low tide by searching carefully the under surfaces of large rugged stones. In the young state, final stage, this is a beautiful and instructive object for the microscope, the remarkable setæ covering the animal exhibiting most curious structure.

Porcellana longicornis, Edw.

This species, though resembling the last-named in general form, is so distinct in its specific features that a description is necessary.

The carapace is nearly round in form, and the three anterior projections are very small, the middle one being slightly grooved; the antennæ are very long, whence the specific name of the animal. The anterior pair of legs are large and heavy, in comparison to the size of the owner, the carapace seldom reaching three-eighths of an inch in diameter; they are ribbed longitudinally and armed with powerful forceps; they are also unequal in size, which is not the case with *P. platycheles*. The next three pairs of legs are simple and hooked at the tips, and the last pair are rudimentary.

P. longicornis is not hairy, like the former species; it also differs widely from it in colour, being generally of a dull reddish tint, but often of a bright red, beautifully marked with brown or white, some that we obtained from the outer Farne Islands having a most brilliant combination of tints. It seems to be often taken in company with the last species, though it is more frequently found in rather deeper water; its range, however, appears to be pretty much the same as that of *P. platycheles*.

In Jersey we were much struck on observing that, whilst *P. platycheles* was invariably found on rugged, overgrown, or

encrusted rocks, *P. longicornis* was just as invariably found on smoother rocks, generally boulders of pinkish syenite, on which it was well protected by its similarity in colour.

Suborder MACROURA.

Galathea squamifera, Leach.

We now approach the Lobster type of Crustacea, although this genus, from its remarkable characteristics, is included in the *Anomoura* by Prof. Bell.

The carapace and abdomen vary much in size; but Bell states that specimens have been obtained three inches in length, the usual size, however, is below this.

The carapace is flattened, ribbed laterally, and armed on either side with spines pointed forwards, terminating in three long spines forming the rostrum; the abdomen is formed of wide segments, terminating in a broad telson, fringed with setæ. The anterior pair of legs are long, equal, and partly spinous, the flat surface however, being covered with scale-like processes, from which it obtains its name. The next three pairs are scaly and hairy, armed with hooked claws at the extremities; the fifth pair are rudimentary, and appear to be used as brushes or cleaners.

The colour of this species is generally of a dull brown, but Bell states that he obtained some from Bognor of a reddish tinge.

It is a common frequenter of lobster-pots, Bognor being mentioned (and found by us) to be a good locality for it. Large numbers were thrown up on the Sussex coast by the great storm of January 18th, 1881. It has also been recorded from Cornwall, Devonshire, Dorsetshire, and all parts of the coast of Ireland.

It is not a deep-water species, being often found at low tide, and we have dredged it at three fathoms.

Galathea strigosa, Fabr.

Although this species much resembles the former, it would perhaps be as well to describe it generally, instead of referring only to those points wherein it differs from *G. squamifera*. It often attains a length of four inches, and its first pair of legs being about the same length as the carapace and abdominal somites, cause it to appear larger even than this.

Its carapace is strongly segmented laterally, the upper margins of each fold being fringed with setæ, and, towards the rostrum, with spines also; the lateral margins are also strongly spinous, the spines pointing forwards in the same direction as the rostrum, which latter is formed of three stout and sharp points. The antennæ are fine, long, and have the basal joint spinous. Eyes kidney-shaped. The anterior pair of legs equal and proportionate, densely covered with spines and setæ, the forceps being beautifully fringed with the latter; the next three pairs also spiny and terminating with a powerful claw; last pair rudimentary.

The colour of this handsome species is usually a warm reddish brown, with decided markings of a bright blue, which, however, should be seen in life to be fully appreciated.

Prof. Bell's graphic description of the rapid backward jerking (for it can scarcely be termed swimming) of this species we can fully endorse, from observations both in a state of nature and in captivity, and it is certainly remarkable to find an animal with anterior eyes of such development whose movements are of such a retrograde character, so to speak, as those of *Galathea strigosa*. Of course, when safely landed in its burrow, or crevice, its eyes are of great service in watching its prey or its enemies; but as to its general movements in the water, they are decidedly in a direction where these organs of vision would be of but little service.

The ova of this species are small, of a golden colour, and connected in groups, of great beauty when examined by the microscope. As regards the zoæa, we may refer our readers to the woodcut in Bell's work; the filamentous tail is very similar to that of the zoæa of *Lithodes maia*, another crustacean of the division *Anomoura*.

G. strigosa is a fairly distributed species, inclining to southern waters; it is common on our south-west shores and in the Channel Islands, though it is found also in our northern seas. At Weymouth it is called the "Spanish Lobster," possibly on account of its bright colours.

(To be continued.)

NOTES AND QUERIES.

Animal Migrations through the Suez Canal.—We learn from 'Nature' that Professor Keller, of Zurich, during a stay near the Suez Canal, has been making a study of the animal migrations due to the opening of this means of communication. These are said to be very positive, though certain causes stop the progress of some species, or at least retard their movements,—for instance, the too sandy nature of the ground; the large lakes; the currents; the passage of ships, which derange the ova and larvæ; and the too great saltness of the canal water. Since 1870 the following have passed from the Mediterranean to Suez:—*Solen vulgaris*, *Umbrina cirrhosa*, *Labrax lupus*, *Balanus miser*, and *Ascidia intestinalis*. Some Mediterranean species are now on their way through (*Solea vagina*, *Cardium edule*, *Sphæroma*), several fishes (*Pristipona stridens*, *Crenidens forskali*, &c.), and some molluscs (*Cerithium scabridum*, *Mactra olorina*, *Mytilus variabilis*) have passed from the Red Sea to the Mediterranean, while a numerous "caravan" was found resting in the basins of the great Bitter Lakes. The fauna of the canal is still too poor for large carnivorous species to find a living in it; hence Rays, Cuttlefishes, &c., do not migrate: nor have Red Sea Corals passed into the canal.

Wild Animals in India.—The 'Gazette of India' contains the returns for 1881 of wild animals and poisonous Snakes killed in British India during the year. The total number of wild animals killed during the year was 15,279; Snakes, 254,968. The total number of persons killed was 21,427, against 21,990 in 1880, and the mortality was far greater in Bengal, the North-West Provinces and Oudh than in other provinces. Of the total number of deaths, 18,610 resulted from Snake-bite, and 2817 were caused by wild animals. The total number of cattle killed decreased from 8536 to 2032. The number of Tigers, Leopards, Bears, and Wolves destroyed was 1557, 3397, 991, and 4538 respectively, as compared with 1689, 3047, 1100, and 4243 in the preceding year; and the number of human beings killed by these animals respectively amounted to 889, 239, 75, and 256, against 872, 261, 108, and 347 in the year 1880. The total amount of rewards paid during the year was Rs. 102,811. Of this sum Rs. 90,850 was awarded for the destruction of wild animals, the remainder (Rs. 11,961) being paid or the destruction of Snakes. Of the latter amount, Rs. 6,214 was paid in the Bombay Presidency. In 'Nature' for December 28th last will be found an interesting article by Sir Joseph Fayrer "On the destruction of life by poisonous Snakes in India." After quoting and commenting in greater detail upon the official returns above referred to, he expresses the opinion that still more zeal might be exerted in exterminating poisonous Snakes in

India, and that the mortality caused by them can only be checked by a system of organized and sustained efforts for the destruction of certain species. He advocates the employment in every district of an organized body of men to seek out and destroy the poisonous species, receiving a reward proportionate to the deadly character and number of those killed, and suggests that magistrates, district and police officers, and civil surgeons be authorized to give the following rewards, namely:—for a *Cobra*, 8 annas; *Bungarus cæruleus*, 6; *B. fasciatus*, 4; *Ophiophagus*, 8; Russell's Viper, 8; *Echis*, 4; and *Trimeresurus*, 2.

The Fauna of a Welsh Village Church.—Our pretty little church, before it was restored a few years since, was in a very dilapidated state. Rabbits had their burrows in the old walls, and the rotten ivy-covered roof was tenanted by Slowworms, which occasionally fell on the heads of the congregation to their great alarm. At the present time numbers of Bats come into the church from an adjoining wood, and make an untidy mess on the floor and seats with the *débris* of their insect-food. One Sunday morning the sexton was told that it would be a good thing if they could be dispersed, and, on returning to the church for the afternoon service, the villagers were amazed to find a large paper tray, upon an old altar-tomb in the churchyard, on which were arranged in rows the bodies of some thirty Long-eared Bats, the spoils of a successful raid after the morning service. Sometimes the preacher, in the midst of his discourse, may hear the Brown Owls hooting from an old tree in the churchyard close at hand.—Murray A. Mathew (Stone Hall, Wolfscastle, Pembrokeshire).

English Deer Parks.—Apropos of a paragraph which has been going the round, relative to the immunity of Deer-parks from taxation, it may be interesting to show that there are many more such parks in England than is generally supposed. There are no less than 334 Deer-parks south of the Tweed, thirty-one of which contain Red-deer. Eridge Park, Sussex, is the oldest; the largest is at the Cheshire seat of Lord Egerton, of Tatton. The extent of this park is 2500 acres. Blenheim is sometimes said to be the largest; but this is an error. It is true that Blenheim Park measures 2800 acres, but only 1150 acres are occupied by Deer. Near London the largest and most famous Deer-parks are those of Richmond and Eastwell; in the Midlands is Thoresby; in the North, Knowsley; and in East Anglia, Grimsthorpe.—'*Land*.'

[This information is apparently derived from Shirley's 'English Deer Parks,' published in 1867, and must be considered to be only approximately correct; for in some counties there are more Deer-parks than Mr. Shirley seemed to be aware. In Hertfordshire, for example, there are ten, although he only enumerates six.—Ed.]

MAMMALIA.

Singular conduct of a Hare.—On the 2nd September last my brother and I were shooting in North Cornwall, and were trying a large uncultivated close, of between twenty and thirty acres in size, in search of some birds which we had just before flushed. I was at a distance of some 200 or 250 yards from my brother, when he kicked out a Hare, and let it go away apparently unhurt. The Hare made for the only gateway, which was some 100 yards from me, and the whole length of the close from the Hare, but in a different direction. I ran towards the gate and got within fifty yards of the Hare when it was nearing the gateway. I shot at it, but without effect, and the Hare ran nearly to the gateway, then turning sharp round faced me, and came right back, making for the hedge behind me, where, however, I could see no place for it to break. As it passed me I fired my second barrel and killed it. My brother and I were both at a loss to know what had caused the Hare to turn and face the gun instead of getting away through the gateway, which was entirely open in every way. When we passed through the gateway, and had gone but ten or twelve yards, my brother put his foot almost on another Hare, and when she went away killed her. He then found that his foot was resting on three leverets not bigger than rats, and it was evident that the former Hare, being the jack, had shirked the gateway so as not to run over the doe in her form. We had dogs with us, but they did not chase, although probably the Hare might have expected they would. I may add that, so far as we could see, there was no other means of exit from the first close but the gateway, it being surrounded, except in that one place, with an unusually high fence and ditch on either side.—Thomas Wolferstan (29, Woolster Street, Plymouth).

Fatal Collision between two Hares.—During a day's shooting on my uncle's land at Boynton Hall, near Chelmsford, about the middle of December, a Hare came by its death in a most extraordinary manner. Two Hares were put up together from a field. Both ran back and tried to pass the beaters, but, on being shouted at, became apparently confused, and ran straight at one another without looking. The result was a collision, after which one Hare fell over, and its neck was found to be broken. The occurrence was witnessed by my uncle's keeper and several of the beaters, but I believe none of the guns saw it. I have heard of a case in which a coursed Hare killed itself by running against a clod of earth, but never before have I heard of such an instance as the foregoing.—Robt. Miller Christy (Saffron Walden).

Former occurrence of the Marten in Norfolk.—I do not know whether you will think it worthy of addition to the notices of Marten-cats

in Norfolk, that I have recently learnt that one was seen throughout the summer at Gissing, in this county, about forty years ago. I have carefully cross-examined my informant, and have no doubt that it was accurately identified, though not obtained.—H. T. Frere (Burston Rectory, Diss).

Mole pursuing an Earthworm above ground. — One day, whilst sauntering down a lane with steep-inclined banks covered with long matted grass, I suddenly heard a rustle on the bank, and, stoppng a moment, watched for a mouse or rat to appear, but to my surprise out came a very large earthworm (*Lumbricus*), wriggling along at a rapid pace, being evidently pursued by some enemy. Before the worm had got clear of the grass, his pursuer, a Mole, poked his head through, and, seizing the worm, bit it in half. He then dragged one piece back, but whether he ate it or simply secured it in some way I cannot say, as the period of his disappearance was so short, and almost immediately he pushed his head through the grass again, and began smelling about for the rest of his prey, which was wriggling in front of him. He soon discovered it, and, seizing hold of it, carried it back. During all this excitement the Mole only showed his snout and head through the grass. Evidently the Mole had been chasing the worm underground, when the latter, coming to the surface, endeavoured, though unsuccessfully, to make its escape.—Frederick Long (Wells, Norfolk).

The Grey Seal in Norfolk.— On November 30th I saw a young female Seal at Yarmouth, which had been killed two days previously on Breydon: as it was undergoing the process of skinning at the time of my visit to Lowne, the birdstuffer, my opportunity for examining it was not very favourable; but Mr. W. W. Spelman, for whom Lowne is preserving it, very kindly allowed me to take away the head, and a subsequent comparison of the skull with a number of specimens in the Museum of the Royal College of Surgeons, under the guidance of Professor Flower, leaves no doubt as to species (*Halichærus grypus*). It will be remembered that an adult female Grey Seal and its little one, killed in December, 1881 (Zool. 1882, p. 187), were the first recorded specimens of this species on the Norfolk coast. The present example measured 4 ft. 3 in. in length from the nose to the end of the hind flipper, and weighed 58 lbs. Mr. Spelman has presented the skull to the Norwich Museum.—T. Southwell (Norwich).

BIRDS.

The Migration of the Common Jay.— Lord Lilford remarks (p. 27), on the unusual number of Jays which appeared in his woods in Northamptonshire early in October. This is very interesting, as their sudden abundance correlates with the great flight past Heligoland on the 6th, 7th, and 8th of the same month. I have recently also received several communications regarding the large and very unusual gatherings of Jays observed in the

large woodlands in the western half of North Lincolnshire. It appears, therefore, very probable that our local birds were last autumn largely reinforced by immigrants from the Continent. — JOHN CORDEAUX (Great Cotes, Ulceby).

Migration of the Jay.—I am glad to be able to add my mite of observation to Mr. Cordeaux's interesting article on this subject. After reading his remarks, I have no doubt that this immediate neighbourhood was affected by the migration in question, though not to the extent of a visit from the main body of migrants. About the 11th or 12th of October, having occasion to pass through some fir woods in this immediate locality, I was surprised at the immense number of jays which were to be seen and heard on every hand, and all appeared in a more or less excited state. I do not mean to say that the Jay is at any time at all rare either near here or in the New Forest, but it is well known to be much scarcer generally than it was some years ago, and this is not to be wondered at when a price is put upon its head. So common were they about the middle of October, that even the most casual observer could not but notice them, and several gamekeepers called my attention to it, one of them telling me that he counted thirteen jays in a single tree, and another telling me he had never seen them so commonly before. The numbers that were caught or killed, by other people besides gamekeepers, during October is also a further proof that they were unusually abundant, and I am quite sure that not half of those I saw were bred in this neighbourhood. The Jay, unlike its gregarious relations, seems to me naturally unsocial, and, like the Magpie, if two or three are together they are generally chasing or fighting each other. Yet there are exceptions even to this rule, but when a certain degree of amity exists between individuals I imagine they are a family party, and members of the same brood, which could not have been the case with the numbers seen congregated together in October last. By the end of the month the numbers to be seen were considerably reduced. These observations were made principally in the fir woods on the western side of the river Avon, but whether the number of jays was increased to any extent in the New Forest I am not in a position to say. A case in point, as to the direction of the flight of migrating birds, may be noticed in the migration of the Skylark, which, as far as I have observed, is never from north to south, but from north-east to south-west, or still more from east to west.—G. B. CORBIN (Ringwood, Hants).

"Elder," a Local Name for the Cormorant.—A few years since, when shore-shooting one cold wintry day at Southerness on the Stewartry coast, I had secured a Cormorant. Shortly after I was carrying the bird along by the legs, when meeting an old woman she exclaimed with an air of mock alarm, "Eh! Ye hae shot ane o' the six Elders!" I subsequently learned

that this is not an uncommon salutation with which to greet one who has bagged a Cormorant, but neither this woman, nor any other person acquainted with this curious remark that I have asked for an explanation, could give me any reason for it, or tell me how it originated. Throughout this county, as I formerly stated ('Zoologist,' 1878, p. 428), the Cormorant is known as the "Cow'en Elder," Cow'en being the provincial pronunciation of Colvend, a seaboard parish on the rocky coast of which these birds formerly nested commonly. In the adjoining county of Wigtown they are known as "Mochrum Elders"—Mochrum being an inland loch, on the banks of which they once bred in numbers, but from which they have lately been nearly, if not altogether, banished. Their territorial titles are easily understood, but why are such voracious, uncleanly creatures called after those decent, douce, peculiarly Scottish productions, the Pillars o' the Kirk? And why a killed Cormorant should be "ane o' the six Elders" is still more inexplicable. However, six Elders are a fair average number with which to constitute that ecclesiastical court, the Kirk Session, which in former times held undisputed sway in rural districts, imposing pains and penalties for breaches of morality, non-attendance at Kirk, Sabbath-breaking, and various other offences. Seaside dwellers familiar with the characteristics of the Cormorants may, by way of revenge for some infliction of the "cutty-stool," have thought it a good return to call a Cormorant an Elder! I shall be pleased if any of your readers can throw light on the subject.—Robert Service (Maxwelltown, Kirkcudbrightshire).

Black Redstart in the North of Ireland.—As the capture of a female Black Redstart here on the 30th of last October, which I reported to you a few days later, is an uncommon event in this northern part of Ireland, I think you may perhaps consider it deserving of a notice in 'The Zoologist.' It is the first time that I have known or heard of a Black Redstart in the North of Ireland since the publication of Thompson's 'Irish Birds.' The facts are as follows:—On October 30th, 1882, a female Black Redstart, which had been catching flies on the window-sills, flew in at an open window into one of the rooms, when I caught it, and, having compared it with a stuffed specimen to verify the species with accuracy, let it go again unhurt. It flew off, and has not been since seen, although probably it is wintering in this country.—Clermont (Ravensdale Park, Newry).

Dipper singing during severe frost.—On the coldest day during the severe spell of weather we had last December, I was by the river-side waiting for a shot at wild duck. The temperature was low enough for my beard to be covered with icicles from my frozen breath. Close to me, on a stone in the river, was a Water Ouzel warbling a soft Thrush-like song, and seeming to be extremely jolly. At the very same spot in the cold weather of January, 1881, I heard a Dipper singing from a large lump of ice in

mid-stream, when there must have been fully twenty degrees of frost. As a fly-fisher I have for many years wandered by the sides of mountain and moorland streams, favourite haunts of the Dipper, during the spring and summer, and yet, strange to say, I only remember once to have heard its song at a season which would seem more appropriate to it.—MURRAY A. MATHEW (Stonehall, Wolfscastle, Pembrokeshire).

The Red-legged Partridge in North Norfolk.—It having been stated by some that the Red-legged, or as we call it the "French," Partridge was very scarce this season, and knowing that a wet summer is always said to affect them more than the English Partridge, I have collected particulars of bags made between the 1st and 20th of October, near Cromer, which give a proportion of about eleven English birds to every Red-leg. But very much depends on locality; thus of forty-one killed at Trimmingham ten were Red-legs, but this was always a favourite place for them, while forty-four killed at Northrepps, adjoining, were English to a bird. There is no doubt that, under the modern system of "driving," they suffer more than they used to do when the plan was to walk the turnips, and the wary Red-legs might be seen topping the hedges far out of shot. Last year I knew of an instance at Plumstead, near Norwich, in which sixty-four Red-legs were killed out of 110 Partridges, but this was very exceptional, and mostly on rough ground, which they like. That the dislike formerly shown to Red-legs is decreasing is certain, and no sportsman who cares about "driving," at which they afford the finest sport, ever thinks of destroying their eggs. Mr. Stevenson, in his article on the Red-legged Partridge as a Norfolk bird ('Birds of Norfolk,' vol. i., p. 411), mentions their habit of perching on trees, but in this respect they have now adopted the habits of their English cousins, and though I have shot at an old Red-leg as he flew out of a hedgerow oak-tree, the circumstance was so very exceptional as to be the only occasion on which I have seen one perching. It may also be partly owing to the yearly diminution of suitable hedgerow timber, and the fact that no young trees are planted since the plan of turning cattle into the fields became general, and the ash in particular, which must once have been a very favourite hedgerow-timber, is completely dying out in Norfolk, and so bad is it for the land that none are planted, though it fetches a price equal to the best oak.—J. H. GURNEY, JUN. (Northrepps, Norwich).

Variety of Wheatear and other Birds.—When staying at Scarborough I went to Filey, and at Brown's, the taxidermist, I obtained a pretty variety of the Wheatear. Its back, shoulders, neck, and top of head were white, here and there speckled with minute grey spots. It was a bird of the year. At Scarborough also I obtained a cream-coloured Hedge-sparrow, pied Lark, and a Ringed Plover with the back a pale drab colour.

A few weeks ago a keeper near here found a nest of young Jays, one of which was white, with slightly yellow markings on the wings, the other three birds being of the ordinary colour.—J. Whitaker (Rainworth, Notts).

Partridge perching.—About the middle of last June I was passing below a large, old, low oak-tree that had once been pollarded, but now bears branches again, when I was startled by what I took to be a Stock Dove coming out of it; but I saw directly after that it was a Partridge, and I believe a Red-legged or French one. Knowing that this bird not unfrequently breeds on the top of straw-stacks, I made search for a nest, but did not find one. The tree stands in a hedgerow near here, and Owls have bred in it.—R. M. Christy (Chignal St. James, near Chelmsford).

Snowy Owl in Donegal.—Mr. W. H. James, the principal light-keeper on the Island of Inishtrahall, at the northern extremity of the county of Donegal, has sent to this museum a Snowy Owl in immature plumage, which he informs me was shot by himself at Inishtrahall on the 19th of November last. It was first observed about six o'clock in the morning, the wind being then north-west, squally, with hail showers.—A. G. More (Curator of the Natural History Museum, Leinster House, Dublin).

The Blue-tailed Bee-eater.—The example of this bird mentioned on p. 33 has at length been traced, and it was exhibited at the scientific meeting of the Zoological Society on January 16th by Mr. H. E. Dresser. Since it proves to be an adult specimen, the mystery of the appearance of this Asiatic species so far west remains as great as ever. Is it possible that it was "changed at nurse?"—Henry T. Wharton (39, St. George's Road, Kilburn, N.W.)

Greenland Falcon in Sussex.—I have taken advantage of a visit to Brighton to call on Mr. Swaysland, to whom I am indebted for an inspection of the Greenland Falcon recorded in the last number of 'The Zoologist' (p. 34). I found it to be a fine adult *Hierofalco candicans* (Gmel.), of a medium character as regards the extent of its dark markings, but I think inclining to the light rather than to the darker phase of this very variable species. This bird, when shot on the 26th September, had just completed its moult, except as to the quill-feathers of the wings and tail; in the latter only two new feathers had yet appeared, both lateral and one on either side. Each of these new feathers is an immaculate white, which is noteworthy, as the older rectrices show traces of dark transverse bars, which, however, are but very slight and rudimentary, except upon the central pair. Mr. Swaysland informed me that the Falcon (probably the same individual) which his son saw at Rousden in June had been observed about that locality for some two months previously, and therefore it had probably not nested. —J. H. Gurney (Northrepps Hall, Norwich).

Late Stay of the Swift.—Chiffchaff in Winter.—In my notice of the late stay of the Swift during the past autumn (p. 30) November 3rd is stated to be the latest date on which I saw this bird last autumn. I find, however, on referring to my notes that the date should have been November 10th. It may be interesting to note that when out shooting near Brecon on December 21st last I noticed a Chiffchaff or Willow Wren flitting along a hedge. To be certain about the species, I shot it, when it proved to be the former.—C. Young (Llandaff).

The Note of the Manx Shearwater.—Lambay Island, off the coast of Dublin, has long been known as a breeding place for this species, though I am not aware that the eggs have ever been brought thence. Watters was informed on Lambay in 1851 that these petrels only visit this island and breed in some years, and not in others. The single white egg found in burrows above the rocks was correctly described, and the bird had decreased in numbers from about fifty, twelve years previously, to a dozen the year before his visit. Prior to this Mr. Montgomery obtained a couple of Shearwaters in a hole in the island, one of which came under Mr. Thompson's notice; but neither Watters nor Thompson appears to have had personal experience of the bird or its nest on the island. I have always seen a few in the neighbourhood of the island during the breeding season, though never more than about three pairs. Once only, in May, 1882, I believe I started the bird from the land. In July, 1880, during a week spent on board a trawler between Dublin and Carlingford, Shearwaters were continually seen, usually in the afternoon and evening, and in little parties of two or three to about a dozen. A more graceful flight can scarcely be observed. As the season grows later the flocks grow larger, and towards night also they seem to gather together. In broad daylight they keep farther to sea, but towards dusk and during the night they fly about the coast. They feed chiefly at night, and probably keep their nesting-holes by day, and thus elude observation. This brings me to a question which I raised in 'The Zoologist' in June, 1880, and enables me to correct a false supposition there made. The cry which I for a time believed to belong to a species of Owl proves to be the utterance of the Manx Shearwater. Such a strange, hoarse, weird, half-strangled noise as they make, and heard on land as I heard it, would instinctively be attributed to the throat of an Owl. To Irish folks, who have no "hooting Owl," it is some satisfaction to have discovered so good a substitute. About eight or nine years ago a lad on Lambay Island brought home a couple of young birds, the like of which he had not seen before, though in the habit of rearing seafowl of all kinds. He took them from holes on the north side of the island one evening, and all through the night there came unearthly noises, which terrified the good woman his mother so much that she ordered them to be removed at daybreak as "uncanny." I have no doubt

these were young Shearwaters. This was told me last May, when my friend Mr. Barrington came with me to Lambay. Up to that time I had not identified the noise, but my supposition that it proceeded from an Owl had been shaken by my Howth friends asserting that they had seen as well as heard the bird flying over the water in the afternoon, and that it was evidently a seafowl. Mr. Barrington was so much interested that he went out that night, and was lucky enough to hear it. Connecting this habitat with that of Howth, I began again to suspect the Shearwater, which I had hitherto set down as a silent bird, in consequence of finding no allusion to its note in the books; and on the 1st July last I was fortunate enough to see and hear a flock of about thirty birds crowing and hooting in concert. Mr. Barrington has described the sound (p. 29) in the syllables "kuck-kuck koo," which, often much prolonged, and repeated quickly five or six times at intervals, is as close as it can be rendered in words. The birds seldom make this noise by day, but on heavy still afternoons in May, June, and July they are not unfrequently to be heard on the south side of Howth. They may then be seen far out to sea, swerving in occasionally, and coming nearer towards dusk. During the night, especially if it be dark, they hardly cease till dawn, flying over the cliffs and land bordering the sea. The sound must be well known to those who fish and boat by night, and to coastguards like McCarron, a correspondent of Mr. Barrington's, who takes much interest in birds, and who suggested the above words for the cry of the "night bird," as it is called in Kerry. Heard at night it is sufficiently gruesome to build any ghostly tales on, and may, perhaps, have favoured a superstition of a "night crow" or "night raven" in its time.—H. Chichester Hart (Dublin).

[It can hardly be said that naturalists have treated the Manx Shearwater as a *silent* bird. Yarrell, for instance, on the authority of D. W. Mitchell, remarks (vol. iii., p. 656):—"They make no noise when disturbed, though in their holes they are eloquent enough, the Scillonian synonyms of *Crew* and *Cockathodon* being derived from the guttural melodies they pour forth." Apparently the Orkney name for this bird, *Lyre*, in Shetland *Lyrie*, noticed by Sibbald, Low, Montagu, and Saxby, has reference to the sounds which it utters. The Norwegian name also, *Skrabe*, looks as if it were onomatopœic. Sir R. Payne Gallwey, in his recently-published work, 'The Fowler in Ireland,' describes the note of this bird, which he heard on the Skelligs (p. 260), as resembling the syllables "Tōōk-ă-hōō, tōōk-ă-hōō."—Ed.]

The Note of the Manx Shearwater.—Referring to my note on the cry of the Manx Shearwater (p. 28), let me draw attention to the statement on p. 260 of 'The Fowler in Ireland,' by Sir Ralph Payne Gallwey, which book has appeared since my note was written. The writer, describing the Skelligs and their sea-fowl, says:—"A few steps farther, and we hear

'Tōōk-ă-hōō! Tōōk-ă-hōō!' coming from under our very feet. Here is a hole, and we find inside the author of the peculiar cuckoo-like cry to be a Manx Shearwater." Edward McCarron, the keeper at the Tearaght Rock, described the sound as "kuck-kuck-ko, kuck-kuck-ko." The inference which I drew is now corroborated by evidence of the most direct character, and a cry has been traced to the Manx Shearwater—a bird hitherto supposed to be absolutely silent—for I could find no mention of a sound being uttered by this bird in any book I consulted when writing my previous note. In its hole the cry is probably subdued, but at night, when flying over the surface of the water, it is very loud and remarkable.—Richard M. Barrington (Fassaroe, Bray).

[See the editorial note appended to Mr. Chichester Hart's communication on this subject.—Ed.]

Rustic Bunting near London.—In the note under this heading (p. 33) it was inadvertently stated that only one previous occurrence of this Bunting in the British Islands (*viz.*, that taken near Brighton in October, 1867) had been reported. A second, however, was shot at Easington, in Holderness, in September, 1881, as recorded by Mr. W. Eagle Clarke ('Zoologist,' 1881, p. 465). The specimen recently reported by Lord Lilford, procured at Elstree Reservoir last November, is therefore the third which has been identified as an accidental visitant to Great Britain.

Shore Lark, Lapland, and Snow Buntings in Kent.—Having heard that a bird-catcher in this district had been catching some Shore Larks in November last, I went to his house to see them. He had then three, taken about two days before my visit, and these were supplemented by four more, seven in all, about a week later. Together with these, and associating with them, he had taken what he termed an "Ortolan," but which was indeed a Lapland Bunting in its winter dress, and this, as well as some of the Shore Larks, I obtained from him. Besides these birds, he had several freshly-caught Snow Buntings, in beautiful white plumage; and, over and beyond these, he produced a fourth bird, evidently only just got (I think he told me the previous day), which he believed to be a hybrid between a Greenfinch and a Common Linnet, *Linota cannabina*, and this conjecture, no doubt, is correct, as the bird bears in a very marked way the characteristics of each of these species. Thus in one visit I obtained from him the three good species, Shore Lark, Snow Bunting, and Lapland Bunting, with the above-mentioned hybrid. All these birds were perfectly clean in tail, primaries, and general plumage. All were shy, and evidently quite fresh caught.—W. Oxenden Hammond (St. Alban's Court, near Wingham).

[Some years ago we remember to have seen a hybrid between the Greenfinch and Linnet, and we believe an example of this cross is in the collection of Mr. Frederick Bond.—Ed.]

REPTILES.

Smooth Snake in Surrey.—No one could be better pleased than myself to hear that the range of *Coronella lævis* is extending. But the description given of the one seen by Mr. Ridley at Chobham Bridges does not tally with what I have observed around Bournemouth. From my experience it is (when first caught) wild and fierce. I had three last summer, which, when first introduced in the same case, were continually biting one another. Sometimes in their anger they would roll themselves together in a knot, biting fiercely, and whenever handled they would turn and bite, but after a week or so two of them became more amiable. One I had some time ago was of like temperament, and in two instances drew blood. I have kept many Grass Snakes (*Natrix torquata*), but have never known them to bite. The Sand Lizard (*Lacerta agilis*) occurs freely in this neighbourhood, and is, as a rule, very fierce. I should be inclined to think the Snake which Mr. Ridley saw was either a tame one set at liberty, or had been injured in some manner. I must express my admiration at that gentleman's conduct in refraining from taking such a rarity.—S. B. Axford (Bournemouth).

BATRACHIANS.

The Natterjack Toad in Suffolk.—'The Zoologist' for December last contains a note from Mr. Macpherson relating to the occurrence of the Natterjack at Aldeburgh. This is one of the few spots in Suffolk where this very locally-distributed species is to be found. A colony of them breed annually at a place called Coldfair Green, some three or four miles from Aldeburgh, the spot chosen being a sandy common, crossed by a small stream, which here becomes widened out, so as to form a sort of shallow pool, communicating with various other small ponds or creeks, and runs eventually into the mere at Thorpe, close to the town of Aldeburgh. In the month of April, during the spawning season, and more especially at night, their loud ringing cry may be heard at a considerable distance, the blending of their numerous voices forming one continuous murmur, not unlike that caused by distant flocks of sheep or of rooks, the effect of which is far from disagreeable. Their croak is totally distinct in character, both from the deep solemn bass of the Frog and the chirping treble of the common Toad. There are several cottages within less than a stone's throw of their breeding place. Natterjacks are also found, I believe, on the coast near Bawdsey, a few miles north of the mouth of the Deben, but I have no personal knowledge of their whereabouts at that place. I found them this year congregated at Coldfair Green in great numbers on the 22nd of April, and there were still a few in the water on the 4th of May. As regards their apparent partiality to the sea coast, the occurrence of this species in Scotland, in great abundance, on the shores of the Solway Frith, as mentioned by Bell in his 'British Reptiles,' and within a hundred yards of spring-tide high-water mark, might also be adduced as evidence.—G. T. Rope (Blaxhall).

FISHES.

Large Pike in the Avon.—About the end of July last a large fish of this kind was caught in the Avon not far from Ringwood. It had been previously seen on several occasions, and many an unsuccessful attempt had been made to capture it by those versed in the "gentle craft." The fish, however, had apparently disappeared from its usual haunt for some considerable time, till one day a small boy, whose angling experience could not have been very extensive—much to his surprise—chanced to hook the ponderous-jawed monster, and brought it "to bank," with the assistance of a man who came to the rescue. I saw the fish soon after its capture, and it measured three feet ten inches in length, and weighed just over 25 lbs. Its appearance was somewhat lean and gaunt, which would, I suppose, account for the comparatively small weight of the creature. Judging from the formidable aspect of its open mouth, it must have been an old enemy to its finny companions, as some of its teeth, especially in the lower jaw, stood up nearly an inch in length. The man who landed it told me he distinctly saw a rat in its throat when first brought ashore. I understand that much heavier Pike have from time to time been met with here, but few exceeding it in length. I am well aware that larger and heavier Pike have been met with in other rivers, but I think perhaps the above may be worth recording. —G. B. Corbin (Ringwood, Hants).

MOLLUSCA.

Food of the Oyster.—Can you give me any information about the food of Oysters? I have looked into several books for details on the subject, but have only encountered very general and vague remarks. It would appear that while the culture of Oysters has provoked considerable discussion, little or no attention has been directed to a discovery of the nature of their food.—R. A.

[The most recent contribution to our knowledge on this subject is contained in an article by M. Certes in the 'Bulletin de la Société Zoologique de France,' 1882, pp. 347-353, entitled *Note sur les Parasites et les Commensaux de l'Huitre.* In this article the writer observes:—"L'huitre est omnivore. Lorsque l'on examine au microscope les liquides extraits de l'estomac on y retrouve plus on moins désagrégés par les sucs gastriques, des grains de pollen, des acariens, des débris d'algues et de crustacés, des diatomées, des foraminifères, des radiolaires, et en tres grand abondance à certaines époques de l'année les œufs et les spermatozoïdes de l'animalcule lui-même."—Ed.]

ARCHÆOLOGY.

Ancient Camps in Epping Forest.—There is a little confusion in the archæological note (p. 36) referring to the explorations at the Forest Camps and the Essex "Dene Holes," which it may be well to remove. The

British Association Committee (composed of members of our Club) is only concerned with the Forest Camps, and all the work, and almost all the money (excepting only the British Association grant of £10) has been supplied by the Essex Field Club. The explorations made last year at Grays, at the Dene-holes in Hangman's Wood, were entirely under the superintendence of the Club, and the proposed complete exploration researches will be also the work of the Essex Field Club.—WILLIAM COLE (Hon. Sec., Essex Field Club).

Ossiferous Cave near Cappagh, Co. Waterford.—The collections from the Bone Cave near Cappagh, mentioned in 'The Zoologist' for 1879, p. 331, and again in the current number (p. 37), have been deposited in the Science and Art Museum, Kildare Street, Dublin, where they occupy a separate case, and are arranged stratigraphically, the implements and other relics of man from each stratum being placed along with the animal remains discovered in the same deposit with them. One side of the case is wholly devoted to the second stratum, or grey earth, in which the broken marrow-bones and other smaller bones of the Irish Elk are associated with human bones, charcoal, and chipped hammer stones. A neighbouring case in the same museum is filled with the remains of Mammoth, Bear, Reindeer, Horse, and other pleistocene mammalia discovered from time to time in the Shandon Cave, five miles from here. The latter collection was arranged there by my much-lamented friend Prof. Leith Adams, whose influence and example led me to the discovery of the former and other caves that contain records of our past zoology, and by whom the animal remains were determined.—R. J. USSHER (Cappagh, co. Waterford).

The Royal Theriotrophium near the Tower of London.—In reply to the enquiry under this head (p. 37), I may observe that a little information on the subject is given in Bennett's "Tower Menagerie" (Introduction, p. 15) which may be of service. It is as follows:—"In 1708 some improvement had taken place, for there were then, according to Strype, no fewer than eleven Lions, two Leopards or Tigers, three Eagles, two Owls, two Cats of the Mountain, and a Jackal. Maitland gives a much longer catalogue as existing there in 1754, and this is still further extended in a little pamphlet, entitled 'An Historical Description of the Tower of London, and its Curiosities,' published in 1774." I have referred to Maitland's 'History of London,' 2 vols. folio (Ch. xvi., p. 172), 1756. He describes at some length "the wild beasts and other savage animals in the Tower at this time, March 25th, 1754," and mentions "a Golden Eagle, which has been kept there upwards of 90 years," and "several other Eagles brought from different parts."—J H. GURNEY, JUN. (Northrepps, Norwich).

SCIENTIFIC SOCIETIES.

Linnean Society of London.

December 21, 1882.—Alfred W. Bennett, Esq., in the chair.

Prof. Adolph Ernst, of Venezuela, and Dr. W. C. Ondaatje, of Ceylon, were elected Fellows.

Prof. T. S. Cobbold exhibited specimens of *Ligula abdominalis* from the Bream, of *L. leucisci* from the Minnow, and of *L. monogramma* from the Grebe, to compare with *L. Mansoni* from man, in illustration of his paper mentioned below. The *L. abdominalis* is the same worm which is called *L. edulis* by Briganti, and is eaten under the name of "macaroni piatti."

Dr. Francis Day read a paper entitled "Observations on the Marine Fauna of the East Coast of Scotland." This contribution was the result of accompanying H.M.S. 'Triton,' sent to survey certain parts of the coast off Aberdeenshire, Kincardine, and Forfar, in July, 1882. He remarked that the migrations of the Herring had given rise to many speculations, but still required elucidation. The chief objects of migration would appear to be a search for a locality where spawn may be safely deposited and the species continued, or a search for food to maintain their existence; but occasionally it would seem the fish migrate from ground where incessant netting and capture render them uneasy or frightened. If going more seaward it is not unlikely their progeny would locate themselves where reared; but again the new location might be found unsuited and the shoal might return to its first habitat. Dr. Day mentioned facts connected with the Wick, Moray Firth, and Aberdeenshire fisheries, showing that at Wick a large form of Herring arrives about the beginning of the year and disappears about March, shoals of a smaller size appearing in May and June; while a larger, fatter sort come in great shoals, and spawn in August and September. As the Wick fisheries declined those of Fraserburgh increased in yield. It is evident that the fishing is now carried on further out to sea, forty or fifty miles being the usual limit. As to the mesh of the nets employed opinions are very different. The same may be said of the nature of the food of the Herring; but Dr. Day's observations point to this being minute Entomostraca, various ova, and small fishes. Whatever may be said by the fishermen of decrease in certain localities, the records of the fishery returns show a steady annual increase in the capture of Herrings from the commencement of this century until the present time. Dr. Day gave the results of his various dredgings, and particularly described the crustaceans and the molluscans, all of more or less well-known forms.

A report on the Echinodermata collected by Dr. Day formed a separate communication, by Prof. F. Jeffrey Bell. *Spatangus purpureus*, *Asterias violacea*, and *Echinus elegans* were abundantly represented. Of the last-

mentioned there were a very large number of small-sized, though not one large specimen. Entangled in the spines of many of them were small egg-cases with unfertilized ova within. The Ophiurids were only six in number, and but a single Holothurian, not in a condition for determination. There were eighteen different species of Echinoderms taken in all.

Further notes on the Zoophytes and Sponges obtained during the cruise of the 'Triton' were embodied in a paper by C. O. Ridley. These groups, though containing few species, were rich in individual specimens. The sponge *Amphilectus* (*Isodictya*) *Edwardi* was represented by finely developed specimens, and the *Suberites ficus*, in some examples, showed instances of the vents on a special excretory area.

Prof. T. Spencer Cobbold then read a description of *Ligula Mansoni*, a new human *Cestode*. The parasite in question was received from Dr. Patrick Manson, of Amoy. After an account of the animal, Dr. Cobbold remarked that the observations of M. Duchamp, taken in connection with the embryological studies of the late Dr. Bertolus, render it extremely probable that the *Ligula* of the Trout is the sexually immature state of the great broad tapeworm of man. If this genetic relation should be established by further researches, it is possible that the proscolices or six-hooked embryos of *Bothriocephalus latus* might, in place of passing through the ordinary piscine host, develop as immature *Ligulæ* within the human body. We know that phenomena precisely analogous to this do actually occur in the case of *Tænia solium*, the proscolices developing into scolices or cysticerci within the human subject instead of passing into the flesh of swine. In this case the ultimate host becomes also the intermediary bearer. An act of cannibalism would certainly bring about the completion of the genetic cycle.—J. Murie.

Zoological Society of London.

December 19, 1882.—Prof. W. H. Flower, LL.D., F.R.S., President, in the chair.

The Secretary made a report on the additions that had been made to the Society's Menagerie during the month of November, and called special attention to a collection of Reptiles from the Western States of North America, presented by Mr. Samuel Garman; and to a young Lynx, from Ballistan, presented by Capt. Baldock, R.A., which was apparently referable to *Felis isabellina*, Blyth.

Mr. Sclater exhibited some photographs of a new Zebra, from Shoa, lately named *Equus Grevyi* by M. A. Milne-Edwards, which had been sent to him by that gentleman, and pointed out the differences which separated this animal from the nearly allied *E. zebra*.

The Rev. H. H. Slater exhibited, and made remarks on, the skin of a Shrike (*Lanius*, sp. inc.), which had been obtained near Spurn Point.

The Secretary exhibited, on behalf of Lord Lilford, the skin of a young

male *Emberiza rustica*, which had been taken at Elstree Reservoir on the 19th November last. Only two other examples of this bird had hitherto been recorded as having been met with in Great Britain.

Dr. Günther exhibited, on behalf of Sir Campbell Orde, Bart., a specimen of a Charr, *Salmo alpinus*, obtained in a loch in North Uist, being the first example ever obtained in this loch.

Mr. P. H. Carpenter exhibited, and made remarks on, some microscopical preparations of *Antedon Eschrichti*, in which a nervous plexus derived from the fibrillar envelope of the chambered organ was visible at the sides of the ambulacra of the disk.

Prof. Flower exhibited a photograph (presented to the Society by Mr. James Farmer) of Seal Point, Farallone Islands, off California, showing the immense number of Seals, *Otaria Gillespii*, frequenting that locality.

Prof. Flower read a paper on the Whales of the genus *Hyperoodon*, in which he pointed out that one of the most important points in the history of these animals yet unsolved was whether the large-headed form, with great development of the maxillary crests, called by Dr. J. E. Gray *Lagenocetus latifrons*, was a distinct species, or whether, as suspected by Eschricht, it was the adult male of the common form known as *Hyperoodon rostratus*. The author had asked Capt. David Gray to avail himself of his exceptionally favourable opportunities of observing these animals in their native haunts, to solve this question, with the result shown in the next communication.

A communication was read from Captain David Grant, S.S. 'Eclipse,' called "Notes on the Characters and Habits of the Bottle-nose Whale (*Hyperoodon*)," in which it was stated that he had killed 203 of these animals last season, and had traced in the males every gradation of development between the two forms, and had therefore conclusively proved that *Hyperoodon* or *Lagenocetus latifrons* had no existence as a distinct species. The communication was illustrated by sketches and photographs, showing the external characters and cranium in various stages of growth.

Mr. P. H. Carpenter read a paper on the classification of the *Comatulæ*. He criticised the method of formulation recently proposed by Prof. F. J. Bell, and pointed out its disadvantages for the purposes of classification, owing to its being inapplicable to those *Comatulæ* which have irregular arm-divisions. He explained his own system of formulation and classification, and stated that he believed it to be capable of dealing with all possible variations of *Comatula* structure.

Mr. F. Day read a paper on the identity of *Arnoglossus lophotes*, Gthr., with *Pleuronectes Grohmanni*, Bonap. A second paper by Mr. Day contained remarks on some hybrids between Salmon and Trout.

A paper by Messrs. Godman and Salvin was read, describing some Butterflies from New Ireland, received from the Rev. G. Brown and Mr. E. L. Layard. Among these were examples of two new species, named respectively *Prothoe Layardi* and *Danais adustus*.

Mr. Oldfield Thomas read a paper containing descriptions of two new species of Fruit-Bats of the genus *Pteropus*, from the Caroline Islands. The author proposed to call them *Pteropus phæocephalus* and *P. breviceps*.

A communication was read from Major G. F. L. Marshall, containing some notes on Asiatic Butterflies. A species of *Amecera* was mentioned as new to the Beluchistan fauna, and three species were described as new.

Mr. G. A. Boulenger read the description of a new species of Lizard from Dacotah, based upon some specimens lately presented to the Society's collection by Mr. S. Garman, of the Museum of Comparative Zoology, Cambridge, Mass., and proposed to name it *Sceloporus Garmani*.

Mr. Arthur G. Butler read a paper in which he gave an account of a collection of Spiders made by the Rev. Deans Cowan in Madagascar. In addition to many interesting and singular forms were specimens of the curious-tailed species *Arachnoura scorpionoides* from Central Madagascar. Six new species were described.

Mr. W. N. Parker read a paper on the anatomy of the Indian Tapir.

Mr. Herbert Druce read a paper descriptive of new species of Moths, chiefly from Western Africa and New Guinea. Fifteen new species were described, as also was a new genus of *Chalcosiidæ* from New Guinea.

January 16, 1883.—Prof. W. H. Flower, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December.

Mr. H. E. Dresser exhibited, and made remarks on, a specimen of *Merops philippensis*, which was said to have been obtained near the Snook, Seaton Carew, in August, 1862.

Lieut.-Colonel Godwin-Austen read the third and last of a series of papers on the shells collected in Socotra by Prof. J. Bayly Balfour. The freshwater shells of Socotra were stated to belong to the genera *Planorbis*, *Hydrobia*, and *Melania*. Not a single bivalve was obtained. Four species were described as new.

Prof. E. Ray Lankester read a paper on the right cardiac valves of *Echidna* and of *Ornithorhynchus*. Seven additional specimens of the latter animal had been examined since the author's former paper on this subject had been read, all of which, whilst showing interesting variations, agreed in the absence of the septal flap of the right cardiac valve. This character was shown to exist also in *Echidna*, and was therefore presumed to be a distinctive feature in the structure of the Monotremes.

A communication was read from Mr. F. Moore, containing the descriptions of some new genera and species of Asiatic Lepidoptera Heterocera.

A communication was read from Mr. G. B. Sowerby, jun., in which he gave the descriptions of five new species of Shells from various localities.—P. L. Sclater, *Secretary*.

NOTICES OF NEW BOOKS.

A History of British Birds; with Coloured Illustrations of their Eggs. By Henry Seebohm. Roy. 8vo, Part I. London: Porter. 1882.

Hewitson's 'Coloured Illustrations of the Eggs of British Birds,' which had reached a third edition before the author's death in May, 1878, has long been the standard work on British Oology. But, although the plates are excellent, and will probably never be surpassed for their fidelity to Nature, it must be admitted that the text as regards many species is out of date. Not only do we know a great deal more about the nidification of certain birds, concerning which little had been ascertained when Hewitson wrote, but several species have since been added to the British list of which no mention is made in his work. The eggs of these have, therefore, to be figured, and some account furnished of their nidification. On this account the work recently commenced by Mr. Seebohm, which will supply these *desiderata*, will be very generally welcomed.

We understand that this new publication will be completed in six parts, issued at a guinea each to subscribers, the first part of which is now before us. We are not sure that we like the tinted background on which the eggs are drawn, as it seems to detract from the richness of tone in some of the more highly-coloured eggs, although it answers well for eggs which are pure white.

The text contains not only a description of each egg and its varieties, but also a very full account of the life-history of each bird. What this comprises is thus indicated by Mr. Seebohm:—"The habits of the bird during the breeding season, at the two periods of migration, and in winter, its mode of flight and progression on the ground, in the trees or on the water, its song and its various call- and alarm-notes, its food and the mode of procuring it at different seasons of the year, its migrations, the dates of arrival and departure, the routes it chooses and the winter-quarters it selects, and above all every particular respecting its breeding [such as choice of situation, materials of nest,

number and colour of eggs, &c.], all these particulars are its real history."

If we may conceive the works of Yarrell and Hewitson rolled into one, with corrections, emendations, and important additions, and with woodcuts as well as coloured plates, such a work will be Mr. Seebohm's when completed.

Report on the Migration of Birds in the Spring and Autumn of 1881. By Messrs. Harvie Brown, Cordeaux, Kermode, Barrington, and A. G. More. 8vo, pp. 101. London: West, Newman & Co., Hatton Garden. 1882.

Now that the British Association for the Advancement of Science has formally appointed a Committee to obtain observations, and the Master and Brethren of the Trinity House, the Commissioners of Northern Lights, and the Commissioners of Irish Lights have concurred in sanctioning the co-operation of the lighthouse-keepers and the keepers of light-ships all round the coast, the questions affecting this subject of so much interest to zoologists seem in a fair way of being solved; albeit some considerable time must elapse before a sufficient series of observations can be collected for utilisation.

At present the matter stands thus:— The services of the light-keepers have been enlisted on the east coast of Scotland at 29 stations; on the east coast of England 36; on the west coast of Scotland 40; on the west coast of England 40; and on the Irish coast 40. In other words, there are at the present time 185 stationary observers on the look-out for the arrival and departure of birds, with instructions to observe and note the time of day or night at which the birds are seen, the direction of the wind and the direction in which they are flying, and the temperature, and to identify the species if possible, or to describe, as accurately as may be, the general appearance as regards both size and colour. They are supplied with printed forms to be filled up and transmitted at the end of the year to the different members of the British Association Committee, who have undertaken to collect and report upon them. Thus the returns relating to Scotland have been arranged by Mr. Harvie Brown; for the east coast of

England by Mr. Cordeaux; the west coast of England by Mr. Philip Kermode; and those for the coasts of Ireland by Messrs. R. M. Barrington and A. G. More, these gentlemen having the advantage of the advice and direction of Professor Newton, who is also a member of the Committee.

The third report of the Committee is now before us, and embodies a large number of statistics, from which the Committee will no doubt later be enabled to deduce valuable conclusions. We need not occupy space here by giving extracts from the Report, for we make no doubt that every ornithologist will secure a copy for perusal in its entirety.

A Manual of the Birds of New Zealand. By Walter L. Buller. 8vo, pp. 107, with thirty-seven uncoloured plates. G. Didsbury, Wellington, N. Z. Trübner & Co., London, 1882.

Mr. Buller's well-known quarto work on the 'Birds of New Zealand,' published in 1872, with its admirable coloured plates by Keulemans, has long been out of print and scarce. A new edition is announced, but pending the preparation of this the author has isued an octavo Manual with the above title, and illustrated with facsimiles of the plates in the quarto work, reduced by photo-lithography, but uncoloured.

As tending to encourage and promote the study of Ornithology in the Antipodes by placing a reliable yet inexpensive guide within reach of naturalists and collectors, Mr. Buller has been well-advised in this publication, which, we have no doubt, will be found useful by many, and especially by those who do not possess the former and larger work.

We must confess, however, that we are disappointed with the text, which does not exhibit that advance and improvement upon the quarto which we should have expected after an interval of ten years. The 'Transactions of the New Zealand Institute' contain many valuable records printed during this interval which might have been quoted by Mr. Buller with advantage; as, for example, that relating to the occurrence in New Zealand of the Australian Roller (or Dollar-bird, as it is termed by the colonists), *Eurystomus pacificus* (Trans. N. Z. Instit., vol. xiv., p. 265).

No information of any kind is given about the nesting habits of the Saddle-back, *Creadion carunculatus*, Gmel., of which so interesting an account has been published by Mr. T. H. Potts, who has also described the changes of plumage which this bird undergoes, but which are not noticed by Mr. Buller. Similarly, we find no reference to the nidification of the Orange-wattled Crow, *Glaucopis cinerea*, Gmel., of the Bell-bird, *Anthornis melanura*, nor of the Pied and Black Fantails (*Rhipidura*), although nests and eggs of all these have been described by Mr. Potts, who has likewise directed the attention of ornithologists to the curious fact that the two last-named species not unfrequently interbreed (Trans. N. Z. Instit., vol. ii., p. 64), a noteworthy observation which Mr. Buller would have done well to quote.

The account given of the Kea, or Mountain Parrot, *Nestor notabilis* (p. 38) is very meagre, in view of all that has been published on the habits of this remarkable bird since the date of Mr. Buller's quarto work;* and the latest information relating to *Notornis mantelli* is too briefly given in the statement that since the appearance of his former work a third example has been "*lately* captured by a party of rabbit-hunters with dogs at a place known as 'Bare-patch,' between Maruia and Upokororo Rivers, on the plains eastward of Te Anau Lake." For "lately" we should read "in 1880," and it would surely have been desirable to direct attention to Professor Jeffery Parker's description of the skeleton (Trans. N. Z. Instit. xiv., p. 245), and to inform the reader that this specimen of *Notornis* was forwarded to England for sale (*cf.* Newton, P. Z. S., 1882), and was ultimately purchased for the Dresden Museum, where it may now be seen.

Describing the Black Oystercatcher of New Zealand, "*Hæmatopus unicolor*, Forster" (*rectius* Wagler) Mr. Buller makes the extraordinary remark that "this species, although far more abundant in New Zealand than the Pied Oystercatcher, appears to have a more confined range, *for it has never yet been recorded elsewhere!*" It happens, however, to be quite as common in Australia as it is in New Zealand, inhabiting all parts of the Australian coast, as well as Tasmania and the Islands in Bass's Straits. It is the more surprising that Mr. Buller should have overlooked this, since in his quarto work he has identified his *H. unicolor* with *H. fuliginosus*, Gould, from Australia!

* See 'Zoologist,' 1880, p. 57; 1881, p. 290.

Gallinago pusilla, Buller, we perceive, still figures (p. 59) as specifically distinct from *G. aucklandica*, although, upon an examination of the type-specimen some years ago and a comparison with several examples of *aucklandica*, we failed to detect any difference, except in point of size, *pusilla*, as its name would suggest, being slightly smaller, a circumstance by itself inadequate, in our opinion, to warrant specific separation. If new species are to be founded in this way merely on a difference of size in individual examples, there will indeed be no limit to "species-making!"

We are at a loss to understand why *Tringa acuminata*, Horsfield, or, as Mr. Buller has it (p. 55), "*Limnocinclus acuminatus*, Horsf.," should be separated from *Tringa* by the interposition of the genera *Numenius*, *Recurvirostra*, and *Himantopus*. Nor do we see any reason why the specific name *baueri* should be retained for the New Zealand Godwit, since that was merely a "museum-name" bestowed by Natterer (not Naumann, as Mr. Buller has it), and no description was published of the bird to which it was applied.

This leads us to remark that it would have been well if Mr. Buller had printed after each specific name adopted by him a reference to the original description, a course which would have added little to the cost of printing, and would have saved the reader a good deal of trouble. Let us hope that should another edition be called for, as we trust it may, these and other useful emendations will be made.

Out in the Open: a Budget of Scraps of Natural History gathered in New Zealand. By T. H. Potts. 8vo, pp. 301. With illustrations. Printed by the Lyttelton Times Company, Limited, Gloucester Street, Christchurch, N.Z. 1882.

Under this title the author has reprinted a number of articles contributed by him to 'The New Zealand Country Journal,' with a few revised papers read before the Philosophical Societies of Wellington and Canterbury.

Many of our readers probably do not see the 'Transactions of the New Zealand Institute' and other colonial journals in which

at intervals these essays have appeared, but the name of the author will be familiar to them in connection with the many interesting articles which Mr. Potts has contributed to 'The Zoologist.'* As an outdoor observer he seems to have had excellent opportunities for becoming acquainted with the life-habits and mode of nidification of many of the less-known New Zealand birds, and has turned these opportunities to good account by a systematic entry in his note-book on the spot of all observations made by him, storing them up for subsequent utilisation. This, no doubt, is the right way to proceed, and the way to avoid the mistakes which would be sure to occur by trusting to memory only.

Amongst the chapters in the present volume may be cited that on the White Heron (pp. 1—8), on New Zealand Hawks (pp. 37—50), the Bell-bird (pp. 113—116), Parrots (pp. 176—183), the Kea (pp. 184—193), on rare or little-known birds (pp. 194—203), Seafowl (pp. 204—220), and "On recent changes in the Fauna of New Zealand," which last-named chapter, like that on the Kea, has already, as noted below, appeared in 'The Zoologist.'

Amongst the illustrations we notice the nest and eggs of the Bell-bird (*Anthornis melanura*), a Kea perched on the back of a sheep, and the nest of the Saddle-back, *Creadion carunculatus*.

It would perhaps have been well had Mr. Potts indicated in every case the particular journal in which each chapter of his book originally appeared, quoting volume and page, instead of leaving the reader to discover it for himself, perhaps with some trouble and inconvenience, for New Zealand publications are not quite so accessible in this country as Mr. Potts would have us suppose.

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* See his "Notes on the Birds of New Zealand," 'Zoologist,' 1871, pp. 2793, 2853; 1872, pp. 3052, 3089; 1874, pp. 3898, 3936, 3979, 4014; 1875, pp. 4409, 4477; "On the habits of the Kakapo, or Night Parrot of New Zealand," 'Zoologist,' 1873, p. 3621; "On recent changes in the Fauna of New Zealand," 1874, p. 4135; "On *Apteryx haasti*," 1874, p. 4158; and "On the habits of the Kea, or Mountain Parrot," 1881, p. 290.